



Noncombustible Construction - A Guide to NFPA 285

Roxul® Noncombustible Insulation

Roxul exterior wall insulation products meet the 2012 International Building Code (IBC) fire requirements for buildings with exterior walls of noncombustible construction.

Roxul offers specific products for cavity wall, curtain wall and fire safing applications. These products have been tested by accredited third party testing laboratories to ASTM E 136 "Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750°C", and are confirmed not to ignite, burn, support combustion, or release flammable vapors when subjected to fire or heat.

When third party tested to ASTM E 84 "Standard Test Method for Surface Burning Characteristics of Building Materials", Roxul insulation products typically achieve a Flame Spread and Smoke Development rating of zero and zero and are confirmed to be noncombustible.

Roxul insulation products are accepted under the 2009 and 2012 International Building Code and meet IBC code requirements as noncombustible materials. Roxul products in and of themselves do not require buildings to be sprinklered.

NFPA 285 testing is not required for exterior wall assemblies that include only noncombustible materials such as Roxul mineral wool insulation.

NFPA 285 and Foam Plastics

NFPA 285 "Standard Test Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components", provides a test method for determining the flammability of wall assemblies containing combustible foam plastics such as expanded polystyrene (EPS), extruded polystyrene (XPS) and polyisocyanurate.

NFPA 285 is specified in the International Building Code for determining the flammability characteristics of exterior non-load-bearing wall assemblies and panels used as components of curtain wall assemblies, constructed using combustible materials, or that incorporate combustible components that are intended to be installed on buildings required to have exterior walls of noncombustible construction.

This means that, except for some one-storey buildings, foam plastics cannot be used in these applications unless they are tested to and pass NFPA 285.

Expanded polystyrene, extruded polystyrene and polyisocyanurate insulation products classified as foam plastic insulation for exterior applications must pass NFPA 285-2012.



The NFPA 285 test criteria requires that the flame spread must not occur either vertically or laterally beyond an accepted distance from the area of flame plume impingement, on or within the wall assembly. Thermocouples are placed through the wall and the defined temperature limits cannot be exceeded; otherwise, the test is considered a failure.

The NFPA 285 fire test is an assembly test, not a component test. Modifications, or substitutions to the tested assembly are not permitted. In practise, all details of an approved assembly must be strictly followed to obtain the required performance.

There are documented concerns with the use of foam plastics in exterior walls, related to the vertical and horizontal flame spread over the combustible faces or through the combustible cores of these materials; even though halogenated flame retardants are routinely added to these materials. Test compliance should be based on actual testing of the proposed assembly rather than engineering judgements and prescriptive component selection based on anticipated performance.

2012 International Building Code

Chapter 26 of the International Building Code governs the materials, design, application, construction and installation of plastic insulation. This section allows for a flame spread index of up to 75 and provides other special approvals and exceptions for combustible foam plastics.

Section 2603.5 of the 2009 and 2012 International Building Code require that "Exterior walls of buildings of Type I, II, III, IV, V construction of any height shall comply with Sections 2603.5.1 through 2603.5.7". This includes: fire resistance ratings, fire barriers, potential heat, flame spread, labelling/listing, and NFPA 268 for ignition resistance (unless protected with an approved thermal barrier).

Section 2603.5.5 Vertical and lateral fire propagation, requires that "the exterior wall assembly shall be tested in accordance with NFPA 285 and comply with the acceptance criteria of NFPA 285."

The IBC allows an exception for one-story buildings (Section 2603.4.1.4) that contain foam plastic insulation having a flame spread index of 25 or less, and a smoke-developed index of not more than 450; shall be permitted without thermal barriers in exterior walls in a thickness not more than 4 inches (102 mm) where the foam plastic is covered by a thickness of not less than 0.032-inch-thick (0.81 mm) aluminum or corrosion-resistant steel having a base metal thickness of 0.0160 inch (0.41 mm) if the building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.

Fire Performance

When tested as part of a complete assembly, selective foam plastics have managed to pass the NFPA requirements. The use of halogenated fire retardants, spray on fire resistive coatings, thermal barriers, protective cement board, stucco finishes and measures such as a decreased air gap in the wall cavity and special treatment around openings enable these combustible materials to meet the NFPA 285 requirements.

It is evident that there is a potential fire hazard associated with the use of foam plastics as a component of systems which meet NFPA 285.



Foam plastics remain combustible, with flame and smoke numbers up to 25/450. Fire exposure that originates from the exterior and smoke developed are not within the scope of NFPA 285. Toxic gases are generated along with this smoke when these materials ignite.

Roxul® sponsored fire tests show the dramatic effects of foam plastic insulation burning uncontrollably with rapid fire when exposed to direct heat or flame. This can be viewed on the roxul website at www.roxul.com.

Compliance with NFPA 285 does not mitigate the need for engineering fire hazard and fire risk assessments. Architects, designers and specifiers need to be cognizant of the dangers associated with the presence of combustible materials in building assemblies. The performance of exterior walls during fire exposure is a critical element of building construction.

Steel, concrete, masonry, gypsum and mineral wool are the materials of choice when fire performance and the presence of combustible materials within the building envelope are of concern.

Roxul mineral wool insulation products offer a noncombustible option, provide the maximum resistance to fire and are a key component of high performance fire barrier and exterior wall systems.

Roxul Provides Superior Performance

Here is the relevant data:

| Parameter | Roxul Mineral Wool | Polyisocyanurate | |
|-------------------------------|--------------------|------------------|-------|
| Flame spread - ASTM E 84 | 0 | 25 | |
| Smoke developed - ASTM E 84 | 0 | 250 - 450 | |
| Contains fire retardants | no | yes | |
| Combustibility - ASTM E 136 | noncombustible | combustible | com |
| Behavior during fire exposure | stays in place | burns | melts |
| Melting temperature °F | 2150 | ignites at 600 | |
| Auto ignition temperature °F | none | 600 | |
| Maximum use temperature °F | 1200 | 200 | |